Interactive comment on "Groundwater use for irrigation – a global inventory" *by* S. Siebert et al.

Anonymous Referee #1

Received and published: 20 July 2010

Overall this is a good article which addressing an important topic-data on groundwater use globally. I have only some relatively minor suggestions for improvement.

The description of the methods was not always that easy to read, and I don't think it would allow the reader to replicate. For example, in one spot it just says a scaling procedure was used without being specific as to what it was. I wonder if section 2.2 couldn't be greatly simplified and a longer and complete description of methods added as an appendix or put on line for reference?

In many places data is put in the text that is already in the tables. The worst offending spot is around line 350, but there are other areas that could be trimmed of repeat information if it is not used to make specific points.

I did not find section 4.3 very satisfactory. The conclusion was that availability is a

good predictor of use. As a simple example of my concern, think of how the picture would have differed 50 years ago. Availability was the same but use very different. Given that, how can you know that availability would predict use in another 10 or 50 years? Perhaps you found an accidental correlation for this moment in time? Best case scenario, the degree of correlation would be expected to change substantially over time. Also see my final point about Shah, at least for South Asia.

The final part of the conclusion, 680-690, doesn't say much. Its main point is to say that the new method highlights hotspots. My question I guess is whether any "new" hotspots were found or if this work just confirmed the existing consensus. My guess is the later.

More minor points:

Line 105. Awkward.

114. I would reword a little. I don't think you can say it is the preferred approach, but rather that this is a new, alternative approach which (may) improve on previous efforts. I don't think in the end you can prove that any estimates are any better than others because of all the assumptions involved in the various models, parameters and even data. There hasn't real verification of this approach either. This may well be the best effort, but I think you have to let the readers decide based on the evidence you present.

152-what does it mean that some definitions are consistent with aquastat? I think you are using aquastat definitions, which is fine.

183-"unless proved wrong". Well, I guess all the statistics are wrong. So when do you decide it is wrong enough to use a different source?

321 The citation seems rather random since nothing else is backed up with citations.

501 Tushaar Shah posits that for South Asia, use is connected with population and not so much aquifer/climate conditions.

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